

PATENT SPECIFICATION

DRAWINGS ATTACHED

1.059.004

1.059.004



Date of Application and filing Complete Specification: May 14, 1965.

No. 20573/65.

Application made in Germany (No. V25993 Vlb/21b) on May 16, 1964.

Application made in Germany (No. V26576 Vlb/21b) on Aug. 14, 1964.

Complete Specification Published: Feb. 15, 1967.

© Crown Copyright 1967.

Index at acceptance:—H1 B(D9X, S1C4, S1D5)

Int. Cl.:—H 01 m 37/00

COMPLETE SPECIFICATION

Electric Accumulator with Spirally Coiled Electrodes

We, VARTA AKTIENGESSELLSCHAFT, of Hagen/Westfalen, Germany, a German company do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to accumulators with spirally coiled electrodes from which it is possible to extract extremely high currents.

In conventional accumulators with spirally coiled electrodes, the maximum permissible discharge current is very largely determined by the length of the current paths lying between the current-producing parts of the electrodes and the terminal posts and by the conductor cross-section of the lugs connecting the electrodes with the terminal posts of the cells. This is particularly the case if each of the two electrodes combined in the electrode winding—as is usual—has only one terminal lug.

To achieve higher currents, which can be easily produced from coiled electrodes because of their large effective surface areas, it had until now been common practice to provide each of the two ribbon-shaped electrodes in a coil with a number of terminal lugs which were secured along the length of the ribbon, being distributed along it.

This well known method however, was combined with considerable constructional and, in particular, production difficulties which again and again led to failures, particularly in mass production. The terminal lugs easily got caught up in each other during winding of the electrodes thus making the production of coiled electrodes difficult. In addition, it was necessary to connect together the lugs of each electrode after the coil had been produced, and to connect them with the terminal post without their, for example, coming into

contact with the cell casing and causing a short-circuit.

The invention mitigates the above mentioned disadvantages of the conventional type of accumulator with coiled electrodes.

According to the invention there is provided an electrical accumulator which can be loaded with high currents, having spirally coiled electrodes of which the terminal posts are connected to the end faces of the electrode winding, in which both the positive and negative electrodes are fitted with a solid metal rim containing no active mass, the rim extending along the whole of the length of the electrode, so that the rim of the positive electrode projects beyond the negative winding on one end face of the electrode winding, whilst the rim of the negative electrode projects beyond the positive winding on the opposite end face and in which each of the above mentioned rims is connected mechanically and electrically to the corresponding terminal post over a large surface.

The invention is diagrammatically illustrated by way of example in the accompanying drawings, in which:

Figure 1 is a perspective view of an accumulator in the course of manufacture;

Figure 2 is a perspective view of a preferred construction showing the terminal posts separated from the ends of the accumulator;

Figure 3 is a cross section on an enlarged scale through one of the welded positions of the rims, and

Figure 4 illustrates a preferred construction of the terminal disc.

In the construction illustrated the positive electrode 1 as well as the negative electrode 2 are separated from each other by the partition member 3 and along the whole of their length they possess a solid metal rim 4 or 5 respectively which contains no active mass. The rim 4 of the positive electrode 1 projects

[Price 4s. 6d.]

beyond the negative winding on one end face of the electrode winding, whilst the rim 5 of the negative electrode 2 projects beyond the positive winding on the opposite face of the electrode winding. Rims 4 and 5 are connected to the corresponding terminal posts 7, 8 over a large surface and are electrically conducting. In a preferred type of construction each of the above mentioned rims 4 and 5 is welded at various spiral positions 6 to corresponding positions lying opposite on adjacent windings. The object is to shorten the current paths.

Figure 3 shows a cross section through one of the welded positions. The connection between electrodes and terminal posts may, for example, be effected by means of butt-welding.

It has proved especially advantageous to fit each terminal disc with at least one raised portion projecting towards the rim of the electrode winding and to secure it to the projecting spiral metal rim by butt-welding.

A preferred type of construction of the terminal disc is shown more clearly in Figure 4. The grooves or corrugations 9, which result in raised portions on the side of the disc projecting towards the rim of the electrode winding, fitted to a relatively large surface, guarantee a well-defined current distribution during welding, so that welding takes place at exactly the required spots, thus avoiding any undesirable welding together of the spiral ribbon. It is especially during high current stress that this additional welding at the welded spots of the spiral electrode ribbon affords the advantage of a particularly good electrically conducting connection. Welding together the rims of equal polarity which lie opposite one another in the winding, as is frequently done to shorten the current paths, is no longer necessary, neither the quality of the connection nor the current conductor suffering in any way by this omission. The production of the accumulator according to the invention is appreciably simplified, with increased efficiency, by the above mentioned rims which form part of the invention.

In Figure 4, four grooves or corrugations 9 are shown, disposed at a mutual angle in each case of 90°. The grooves or corrugations 9 generate raised portions which lie on the coiled electrode rims and provide excellent contact in the described welding process. The number and arrangement of the raised portions can be varied. Welding is effected in a

manner similarly to the conventional double point welding, in which both the welding electrodes lie on the lid and the flow of current is released by the required contact pressure.

The accumulator according to the invention is distinguished in its manufacture particularly by the fact that the coiled electrode has no projecting parts that could injure operatives engaged in its manufacture—in addition to causing difficulties as described above. Short-circuiting during incorporation into the cell casing is practically an impossibility.

In operation, accumulators constructed according to the invention have a current loading capacity which could hitherto be attained only with great technical effort and a risk regarding defects through short-circuiting and the like.

WHAT WE CLAIM IS:—

1. An electrical accumulator which can be loaded with high currents, having spirally coiled electrodes of which the terminal posts are connected to the end faces of the electrode winding, in which both the positive and negative electrodes are fitted with a solid metal rim containing no active mass, the rim extending along the whole of the length of the electrode, so that the rim of the positive electrode projects beyond the negative winding on one end face of the electrode winding, whilst the rim of the negative electrode projects beyond the positive winding on the opposite end face, and in which each of the above mentioned rims is connected mechanically and electrically to the corresponding terminal post over a large surface.

2. An electrical accumulator, according to claim 1, in which each of the rims is welded along its spiral edge at a number of positions to oppositely positioned spots on the adjacent windings.

3. An electrical accumulator according to claims 1 or 2, in which the terminal posts are fitted with terminal discs which each have at least one raised portion facing towards the rim of the electrode winding.

4. An electrical accumulator, substantially as hereinbefore described and illustrated in the accompanying drawings.

EDWARD EVANS & CO.,
53—64 Chancery Lane, W.C.2,
Agents for the Applicants.

1059004

COMPLETE SPECIFICATION

1 SHEET

This drawing is a reproduction of the Original on a reduced scale

Fig. 1

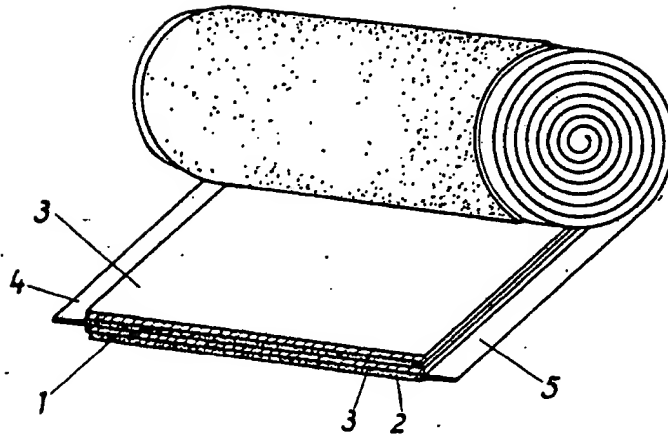


Fig. 2

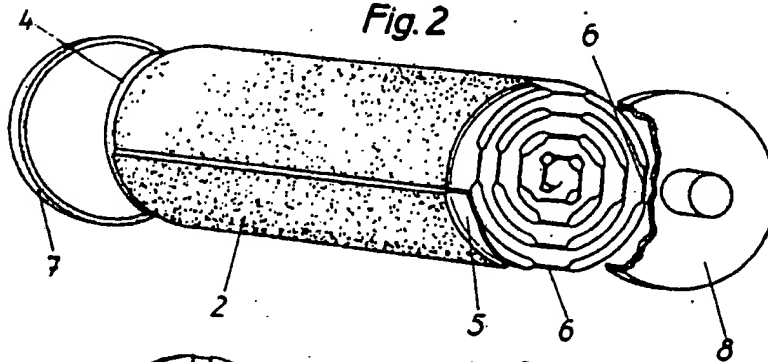


Fig. 3

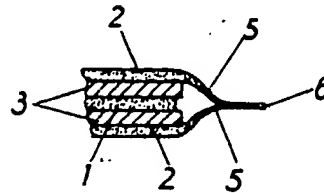


Fig. 4

